## REMARKS

Applicants respectfully request reconsideration of the above-captioned application as amended.

By this amendment, claims 1-30 are presented for examination. Original claims 1-5 have been amended in terms which more clearly define the invention. New claims 6-30 have been added. All these claims are fully supported by the specification, and no new matter has been added. Claims 1 and 16 are the independent claims. Favorable reconsideration is respectfully requested.

For the Examiner's convenience, Applicants note that new claims 6-15 are dependent on method claim 1, and new claims 16-30 are apparatus claims respectively corresponding to claims 1-15.

In the Office Action, the Abstract was objected to as being of improper form. As shown above, a new Abstract is presented which is in proper form, and approval of the new Abstract is respectfully requested.

In addition, in presenting amended claim 1 above, Applicants have used proper alignment.

In the Office Action, claim 1 was rejected as being obvious over U.S. Patent 6,738,639 to Gossselin in view of U.S. Patent No. 6,553,002 to Bremer et al. Claim 2 was rejected over Gosselin and Bremer et al. further in view of U.S. Patent No. 6,247,059 to Johnson. Claims 3, 4 and 5 were rejected over Gosselin and Bremer et al. further in view of U.S. Patent No. 5,999,179 to Kekic.

As shown above, Applicants have amended independent claim 1 to remove certain informalities and to clarify the claimed structure, but not to overcome any subject matter or any

formality rejection under 35 U.S.C. §§ 102, 103 or 112. Applicants respectfully submit that amended independent claim 1 and corresponding new independent claim 16, together with the remaining claims respectively dependent thereon, are patentably distinct from the cited prior art for the following reasons.

The primary reference is U.S. Patent No. 6,738,639 to Gosselin. Briefly, Gosselin teaches a network in which a mobile switching center ("MSC") 50 is connected via a tree network of routers 90 to base stations 30. In the figures, each base station 30 is connected by a bus type of "subnetwork" to a respective router 90. The MSC 50 desires to communicate messages to a group of the base stations 30. To that end, the base stations 30 are organized into multicast groups. The MSC can then transmit a multicast message to a group of base stations 30 by sending the message in a single packet containing the multicast address of the group to be contacted.

In contrast, the present invention as defined in the pending claims is directed to method and apparatus that provide *group control* by a source apparatus of a plurality of nodes while using *unicast* addressing. Thus, amended independent claim 1 recites:

> *"(b) receiving a specification to send a set of one or more messages from a source to the particular group of nodes, the specification designating the particular group and not specifying any particular node of the particular group; and*
>
> *(c) if each node of the particular group has a return path to the source, then, for each given node of the particular group:*
>
> *transmitting from the source a packet containing a network layer header, including an address corresponding to the given node, but not the other nodes, of the particular group."*



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Correspondingly, new independent claim 16 recites:

> *(b) a reception unit receiving a specification to send a set of one or more messages from the source apparatus to the particular group of nodes, the specification designating the particular group and not specifying any particular node of the particular group; and*
>
> *(c) a transmission unit for, if each node of the particular group has a return path to the source, then, for each given node of the particular group:*
>
> *(d) transmitting a packet containing a network layer header, including an address corresponding to the given node, but not the other nodes, of the particular group."*

Thus, the present invention does not reside merely in the use of unicast addressing, but rather more broadly provides the advantages of group control in combination with unicast addressing and *without* the structural limitations necessary in prior art source/node configurations such as in Gosselin. That is, Gosselin's technique is designed to work in a limited environment in which router or other control nodes are positioned between the source and the destination nodes. Applicants respectfully submit that the teachings of Gosselin are limited by the structure disclosed therein such that Gosselin's technique will be effective only in that type of structure. It is submitted that when a broader range of allowable structures is contemplated, for example, a star structure in which messages are sent from a source to the destination nodes in parallel, Gosselin's technique would be unworkable.

Applicants further respectfully submit there is nothing in the disclosure of Gosselin that would teach or suggest to one of ordinary skill in the art why or in what way Gosselin's technique would be unworkable, or and how this problem could be resolved. Accordingly, Applicants submit that it would not have been obvious whether or how to modify Gosselin, such as by reference to any of the other prior art cited in the Office Action, to use unicast addressing with group control, as defined in the pending claims, for the following reasons.



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Applicants will first discuss the disclosure of Gosselin in more detail. Although it is not stated in Gosselin, it is well-known that a multicast packet is communicated as follows. A first router (e.g., router 90 attached to the MSC 50 in Gosselin) receives the message from the source (e.g., the MSC 50). This router consults its routing table to determine to which ports to send a copy of the message. Note that the router will transmit one or more copies of the message as needed, namely, one to each other router on a path to a destination node in the multicast group.

When the message is received at a router attached to a subnetwork, that router will decide by consulting its routing table whether or not to transmit a copy of the multicast message on the attached subnetwork. The router's routing table will have an entry directing transfer of a copy of the multicast message onto the attached subnetwork if the router was most recently informed that at least one node on the subnetwork subscribed to the multicast group whose address matches the multicast address in the received multicast packet. Once on the subnetwork, all nodes subscribed to the multicast group will receive the multicast packet.

Gosselin expressly describes that IGMP is used (col. 7, lines 41-43). According to IGMP, each router attached to a subnetwork periodically polls the nodes on the attached subnetwork to ask the nodes to advise of all multicast groups to which they are currently subscribed. The nodes respond and the router node uses such responses to update its routing table. Also, according to IGMP, the routers communicate with each other so that routers that are connected to each other can store in their multicast tables sufficient information for indicating when a multicast packet should be outputted from one router to the next. Such inter-router communication is required to ensure that routers will forward multicast packets to other routers that attach subnetworks containing nodes subscribed to various multicast groups.



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It is readily apparent that nodes that support multicast communication, and its supporting management protocol IGMP, are "chatty" -- the nodes must communicate with each other frequently to ensure that multicast communication can be achieved. Such chattiness uses up some communication bandwidth. Also, there is a presumption that the router nodes can easily communicate with one another. Finally, some memory is required at each router node to store the routing table.

The present invention as defined in the pending claims avoids this problem because it does not require the inter-communicating router nodes in Gosselin's structure.

However, it would not have been obvious to modify Gosselin to remove the router nodes. First, there is no teaching or suggestion of how to do this in Gosselin, nor does Gosselin suggest that this would be an advantageous thing to do. More importantly, however, there is a feature in Gosselin that pertains to the flow control of response messages that would teach away from such a modification, even if the modification were considered.

Specifically, in Gosselin, once the MSC 50 transmits a multicast message, the message will be delivered to all recipient base stations 30 (col. 5, lines 29-33). If a reply is required, all base stations 30 will initiate a reply. Thus, the only way Gosselin teaches to communicate with a group is for the MSC 50 to transmit a single multicast message, which will initiate all base stations 30 to reply, once they have received the multicast message. Note, however, that all of the base stations 30 are connected by bus types of subnetworks. Only one node on a bus-type of subnetwork can communicate at any one time. Thus, the bus-type topology institutes a form of localized flow control of response packets: all base stations 30 attempting to reply on a single bus-type of subnetwork will have to take turns in sending their reply messages to their attached router 90.



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Applicants respectfully submit that the multicast solution of Gosselin would be difficult to implement in certain other network topologies, such as a star topology, which is permitted by the pending independent claims. In such a topology, one source (manager node) transmits to multiple nodes (router nodes) in a broadcast fashion such that the nodes receive the message simultaneously. On the other hand, each of the router nodes, or very many of them, have distinct parallel paths for communicating their responses back to the source node.

In an example of this topology, a source node transmits an RF signal via satellite bearing a message which is contemporaneously received via satellite earth stations at the router nodes, the destination devices to be controlled by such messages. The router nodes are often widely geographically dispersed and therefore tend to NOT to be on the same local area network/subnetwork. These router nodes have their own unique return paths for transmitting messages back to the source node. Thus, there is no local flow control for return messages from the router nodes.

In this example, the router nodes, which are the destination devices of the messages, all receive the same message from the source node at the same time. If the message were a multicast message requiring a reply, as in Gosselin's technique, then each router node would more or less simultaneously attempt to transmit a reply message. Since each, or at the very least very many, of the router nodes has its own unique and distinct return path for transmitting a reply, there is no flow control for such return messages local to the router nodes. Instead, a flood or storm of reply messages will arrive at, or very near, the source node. Such congestion for reply messages can result in message dropping. This slows down or can actually even prevent satisfactory receipt of reply messages. In the case of issuing control messages from the source node, such as messages that describe communication changes that are critical to enabling receipt



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of future transmitted messages at the router nodes (e.g., communication of message formats, decryption keys, software updates, RF frequency channels on which future communications will occur, PID's or other packet/slot identifier information), message dropping can result in total communication failure.

The present invention as defined in the pending claims enables the user to communicate control messages to an entire group by enabling the user to designate a whole group at once, rather than individually selecting each of multiple group members one at a time. However, the claimed invention achieves this in a fashion that does not require use of multicast communication -- organization of the nodes into groups need not occur at the network communications layer, but rather at some higher application layer. That is, the invention uses unicasting in a novel way to still allow messaging to an entire group in a single simple operation – the invention achieves this by translating a user's designation for transferring a message to an entire group of users into multiple copies of the message, where each copy is separately and individually sent from the source node in a unique unicast manner. Among other things, this enables the source node to control the flow of reply messages; unicast messages assuredly will be received in sequence, not in parallel, and thus the recipients (the router nodes) will not all reply simultaneously. Also, the claimed invention enables the rate of outgoing unicast messages to be controlled at the source node, if desired, thereby further controlling the number of destination nodes (router nodes) attempting to reply at any one time. Such control is entirely not possible using Gosselin's multicast technique as the source, the MSC 50, can only communicate with the group by sending one single message (that is delivered to multiple destinations).

As a further benefit, the claimed invention dispenses with the need for IGMP. Such a technique is not needed in applications where: (1) routers do not transfer replica copies of the



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message between each other until the message arrives at the subnetwork containing the destination; and (2) the destination nodes do not, themselves, determine whether or not they want to be part of a multicast group. In the context of a source node that manages destination nodes, the source node can determine into which groups each destination node should be placed. Also, in a star topology network, the router nodes need not transfer messages between them to get a message from the source to any destination; the source can communicate directly to one single router node to deliver a message. Thus, the claimed invention provides the benefit of dispensing with the very "chatty" and memory intensive IGMP needed to support multicast communication. At least, none is needed to control the router nodes according to the claimed invention.

The other references cited in the Office Action are each directed to a form of unicast messaging. However, Applicants have not found any teaching or suggestion therein of communicating with a group of nodes by designating a group, yet transmitting one unique copy of the message in unicast format to each member of the group from the source node.

In short, the claimed invention provides the source/manager node operator the simplicity of designating a whole group of nodes in a simple operation, yet uses the simpler and more manageable unicast communication technique. None of the prior art references cited in the Office Action consider central control of multiple destination nodes in a star topology network and therefore none of the prior art references appreciates the challenges faced by attempting to control multiple nodes in such a network. In contrast, the present invention as defined in the pending claims, and in particular pending independent claims 1 and 16, has recognized the possibility of different topologies, has recognized the problems raised thereby, and has provided a novel, unobvious and advantageous solution.



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The dependent claims also recite independently patentable features of the present invention. In particular, dependent method claims 9, 10 and 11, and their corresponding apparatus claims 24, 25 and 26, are directed to the feature wherein the source has access to the unicast addresses prior to transmission of the packet. Thus, claim 9 recites that "the source knows, prior to said step (d), each of said addresses corresponding respectively to one of the given nodes of the particular group." Correspondingly, claim 10 recites that the method further comprises "the step (d1) of, prior to said step (d), storing, at the source, each of said addresses corresponding respectively to one of the given nodes of the particular group," and claim 11 recites that the method further comprises, "prior to said step (d), a step (d1) of obtaining, at the source, each of said addresses corresponding respectively to one of the given nodes of the particular group."

None of the cited references discloses or suggests these recitations. Indeed, it would not be necessary to perform these steps in Gosselin because Gosselin teaches communication to groups using a multicast address assigned to the entire group of nodes. None of the other cited references teaches controlling multiple nodes of a group, and thus there is no motivation to obtain a unique address of each node in a group.

New method claim 15 recites that the method comprises the further step of "prior to said step (a), obtaining, at the source, a plurality of addresses, each of the plurality of addresses being a unicast address for a respective one of the given nodes of the particular group, wherein said step (a) of dividing, performed subsequent to obtaining the plurality of addresses, is achievable entirely at the source without communication of messages from or to the source and without communication of messages among any of the plurality of to-be-managed nodes."

New claim 30 is a corresponding apparatus claim.



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Applicants respectfully submit that none of the cited references disclose or suggest the additional features of claims 15 and 30. Gosselin teaches to send messages to a group of nodes by sending one multicast message to the group containing whatever information is intended for the group. To achieve this, Gosselin teaches to use IGMP to divide the nodes into the multicast groups. According to IGMP, nodes are divided into multicast groups by transmission of many messages between nodes. Namely: (a) routers send messages to base stations asking them to supply their respective information; (b) base stations reply with their information; and (c) routers communicate multicast membership information among themselves.

In contrast, according to claims 15 and 30, once the source has the unicast addresses, the source can achieve a division into groups without such communication.

In view of the above amendments and remarks, Applicants respectfully submit that claims 1-30 herein are patentably distinguished from the cited prior art.

Applicants respectfully submit that this application is now in condition for allowance. Accordingly, the Examiner is respectfully respected to allow claims 1-30 and to pass this case to issue.

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Respectfully submitted

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